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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,922	05/10/2001	Masafumi Sakamoto	134.137	4415

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EXAMINER
JONES, JUDSON

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 09/25/2002 13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/851,922	Applicant(s) SAKAMOTO, MASAFUMI
	Examiner Judson H Jones	Art Unit 2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2002 and 03 September 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 20-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 20-29* is/are rejected.

7)☒ Claim(s) *2 and 3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Applicant's arguments with respect to claims 1-3 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 20-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto 5,386,161 in view of Bedford 3,678,352. Sakamoto '161 discloses the magnet type stepping motor having a cylindrical permanent magnet rotor with alternating N and S poles and having three phase windings and 6m pieces of stator main poles with one phase wound around the first and every third pole but does not show m pieces of N pole and m pieces of S pole formed alternately on the 6m pieces of stator main pole. However Bedford figure 4a discloses three phase windings, the winding of one phase wound around a first pole and the third pole of a six pole permanent magnet machine and m pieces of S pole and m pieces of N pole formed alternately on the 6m pieces of stator main pole for the purpose of improving the efficiency of the motor by making the wave shape of the back EMF and the wave shape of the energizing voltage similar as described in column 1 lines 5-18. Since Sakamoto and Bedford are both permanent magnet motors driven by three phase voltage supplies, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the winding arrangement of Bedford in the circuit of Sakamoto in order to increase the efficiency of the motor by making the wave shape of the back EMF and the wave shape of the energizing voltage similar.

In regard to claim 20-23 and 25-28, see Sakamoto figure 3.

Claims 1 and 24 are alternatively rejected under 35 U.S.C. 102(b) as being anticipated by Bedford in view of Ray. Bedford figure 4a discloses three phase windings, the winding of one phase wound around a first pole and the third pole of a six pole permanent magnet machine as shown in figure 3a but does not disclose his device as usable for a stepping motor. Bedford discloses opposing poles of alternating polarity in column 7 lines 3-7 for the purpose of increasing the efficiency of the motor by making the wave shape of the back EMF and the wave shape of the energizing voltage similar as described in column 1 lines 5-18. In regard to stepping motors, Ray teaches in column 5 lines 49-60 and in figure 1 using a six stator pole, two rotor pole machine as first a rotating and then a stepping motor for the purpose of controlling an aircraft aileron, an automatic door opener, for braking or for robotic equipment as described in column 1 lines 13-24. Since Bedford and Ray are both from the same field of endeavor as shown by their US PTO classifications, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the control system of Ray with the motor of Bedford in order to use the Bedford device in a aircraft for controlling the aileron, in a robotic machine, or to control an automatic door opener.

Claim 29 is alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Bedford as modified by Ray and further in view of Mecrow. Bedford as modified by Ray discloses a stepping motor with three-phase windings and an equal number of N and S rotor poles but only discloses six stator pole pieces instead of twelve. However Mecrow teaches in column 8 lines 45-53 varying the number of stator and rotor poles in double salient reluctance machines including stepping motors and hybrid stepping motors, as described in column 2 lines

10-24. Mecrow also states in those lines that his invention has been illustrated with a three phase SRM with 6-4 or 12-8 construction, thus specifically teaching doubling the number of stator and rotor poles. While the motor embodiment used in this rejection is not a SRM, Bedford teaches two embodiments. One is a SRM and the other is a permanent magnet motor. See figure 4a for a 6-2 permanent magnet motor and see figure 5 for a 6-2 SRM. Bedford teaches here that the stator/rotor ratios suitable for SRMs are equally suitable for permanent magnet motors. Since Bedford as modified by Ray and Mecrow are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have doubled the number of stator and rotor poles in the permanent magnet motor of Bedford as modified by Ray and to have made a 12-4 machine and thus increased the number of steps the motor could make in a 360° rotation or alternatively increased the power of each step, in order to increase the usefulness of the stepping motor by making it usable in more applications. Furthermore, such a rotor in 12-4 the permanent magnet rotor would necessarily be circular, as there isn't enough room to make separate magnet rotor poles. See Mecrow figure 16 for an eight pole stator and a circular rotor for a SRM.

Allowable Subject Matter

Claims 2 and 3are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or teach a three phase permanent magnet stepping motor

with a number of rotor poles as specified in the formula in claims 2 and 3. Sakamoto 5,386,161 discloses a formula in the abstract of the disclosure where P=12n±4, not 12n±2.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ
September 23, 2002

Judson Jones
AU 2834